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In Connecticut: Improving Patient Medication Management In Primary Care

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ABSTRACT Medications are a cornerstone of the management of most chronic conditions. However, medication discrepancies and medication-related problems—some of which can cause serious harm—are common. Pharmacists have the expertise to identify, resolve, monitor, and prevent these problems. We present findings from a Centers for Medicare and Medicaid Services demonstration project in Connecticut, in which nine pharmacists worked closely with eighty-eight Medicaid patients from July 2009 through May 2010. The pharmacists identified 917 drug therapy problems and resolved nearly 80 percent of them after four encounters. The result was an estimated annual saving of \$1,123 per patient on medication claims and \$472 per patient on medical, hospital, and emergency department expenses—more than enough to pay for the contracted pharmacist services. We recommend that the Center for Medicare and Medicaid Innovation support the evaluation of pharmacist-provided medication management services in primary care medical homes, accountable care organizations, and community health and care transition teams, as well as research to explore how to enhance team-based care.

The Institute of Medicine reports *Preventing Medication Errors*¹ and *To Err Is Human*² strongly recommended setting two national health care priorities: improving patient safety and reducing medication errors. Such errors are defined by the National Coordinating Council for Medication Error Reporting and Prevention as “any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the health care professional, patient, or consumer.”³ *Preventing Medication Errors* also proposed a research agenda for examining medication use and safety issues in ambulatory care settings and making changes to reduce errors.

Another Institute of Medicine report, *Crossing the Quality Chasm*,⁴ presented a comprehensive strategy for fostering innovation and improving

the delivery of care. The report proposed a goal for the nation: to deliver health care that is safe, effective, patient-centered, timely, efficient, and equitable. It advocated redesigning the health care system based on several principles that are congruent with the patient-centered medical home.⁵

Despite the widespread dissemination of these reports, little has been done to improve the use of medication in primary care settings. We continue to tolerate the status quo, accepting preventable medication errors as mere accidents. Health care organizations have not paid adequate attention to the need to examine medication-related work flows in the medical office; develop shared care plans for interdisciplinary medication management and care coordination; and improve collaboration and communication among multiple prescribers and pharmacists.

Medication Use In Primary Care

Medications are a cornerstone of the management of most chronic conditions. A 2010 report⁶ showed that approximately 70 percent of physician office visits for patients older than age forty-five years resulted in medications' being prescribed or continued. This represents a 10 percent increase over a ten-year time frame.

For patients with chronic diseases, various factors—such as having multiple medical conditions, seeing several providers, taking numerous medications, and having adverse reactions to drugs—can complicate the appropriate use of medications. According to the Commonwealth Fund's 2008 International Health Care Survey, 71 percent of US adults had two or more chronic conditions; and of adults with chronic conditions, 59 percent were seeing three or more physicians, and 48 percent were taking four or more prescriptions for chronic diseases.⁷ Studies have found that 32 percent of adverse events leading to hospital admission were due to medications⁸ and that drug interactions are an important issue in medication use at home.⁹ Furthermore, only 33–50 percent of patients with chronic conditions adhere completely to the medication regimen prescribed by their health care providers.¹⁰

Pharmacists' Impact On Quality And Economic Outcomes

Direct patient care by teams of health care providers, including pharmacists, can improve medication use and safety.¹¹ A systematic review of 298 studies provided compelling evidence of the beneficial impact of pharmacist-provided care on therapeutic and safety outcomes across health care settings and chronic diseases.¹² In another systematic review, pharmacists' patient care services reduced drug expenditures, hospital admissions and lengths-of-stay, and emergency department visits, helping to lower health care costs.¹³

In 2007 the Connecticut Medicaid program received a Centers for Medicare and Medicaid Services Medicaid Transformation Grant to test innovative ways of improving the effectiveness and efficiency of care provided to Medicaid beneficiaries. As part of this demonstration project, we developed a team-based approach that included pharmacists to optimize medication management and patient safety in a primary care medical home model.

In this article we describe the impact of medication therapy management services provided by pharmacists on the quality and cost of care in primary care settings. Medication therapy management is a systematic process of collecting

patient-specific information, assessing medication therapies to identify medication-related problems, developing a prioritized list of medication-related problems, and creating and implementing a plan to resolve them.¹⁴ We present key findings from our demonstration project, identifying patient medication needs that are not being as well met as they could be, and opportunities to improve the quality and safety of medication use in primary care practices.

Study Data And Methods

A PHARMACIST NETWORK Primary care providers face two important barriers to working with pharmacists to provide medication management services. First, some providers cannot afford to hire the pharmacists. And second, there is no retail business model to support pharmacists' involvement in direct patient care. To overcome these barriers, the Connecticut Pharmacists Association formed a network of independent pharmacists, who are available to work on a contractual basis with payers, provider groups, and employers.

For this demonstration project, pharmacists had to have experience with medication management and to present a portfolio of patient cases that demonstrated their experience with direct patient care services. Nine pharmacists in this network participated in our demonstration project and were reimbursed directly as independent contractors for patient care services on a fixed-fee basis. The network contract fees were \$2–\$3 per minute on average for medication management services.¹⁵ The pharmacists were paid to review medical charts and pharmacy claims before meeting with patients; provide medication management services; develop patient medication action plans; and send summary medication management reports to providers after meeting with patients.

SITE AND PARTICIPANT CRITERIA We conducted the project at four federally qualified health centers—which together provided primary care for 98 percent of the patients in our study—and one private practice in Connecticut. The clinical leaders at each of these five primary care sites were committed to patient care based on interdisciplinary teams, and each site had been using electronic health record systems with e-prescribing capabilities for at least twelve months. The sites allocated space where the pharmacists could meet privately with patients.

We enrolled participants from a list of eligible adult Medicaid beneficiaries who received primary care at these sites, had at least one chronic condition, and were taking three or more prescription medications for chronic conditions.

Unlike other disease-specific studies—which looked at medications for only some chronic conditions—this program assessed medications for all chronic conditions, including pain, lipid disorders, hypertension, asthma, chronic obstructive pulmonary disease, diabetes, and depression.

DATA SOURCES The network pharmacists in the project had three sources of medical and medication information for each patient: the electronic health record, pharmacy claims, and face-to-face discussions during appointments.

Before each appointment, the pharmacist reviewed the patient's medical information and pharmacy claims data. The electronic health record provided diagnoses, medical history, medications, laboratory results, progress notes, and reports from specialists or consultants. Medicaid pharmacy claims provided data to assess trends in the patient's use of medication.

Patients brought all of their current medications—prescription, nonprescription, and herbal medicines; dietary supplements; and physician samples—to each appointment. The pharmacists conducted thorough interviews and then constructed an active medication profile for each patient. The pharmacists reconciled discrepancies using information from the electronic health record, pharmacy claims, and encounters with patients.

PHARMACISTS' INTERVENTIONS Pharmacists met with Medicaid patients in the offices of their primary care providers. These meetings were between the patient's other primary care appointments, not at the same time as scheduled physician visits. Each patient was eligible for an initial appointment of sixty to seventy-five minutes with a pharmacist, and five follow-up appointments at monthly intervals, each lasting twenty to forty minutes.

Our program divided the pharmacist's provision of medication management services into a series of steps. First was preparing the active medication profile, described above. Next was assessing each medication for its appropriateness, effectiveness, and safety and for patient adherence—in that order—in providing optimal treatment.

After that, the pharmacist identified any drug therapy problem, such as the inappropriate choice of a medication; the omission or duplication of a medication; dosages that were too low or too high; drug interactions; adverse reactions to medications; a patient's difficulty adhering to the treatment regimen, or issues relating to health literacy; and cost beyond what the patient could afford. The pharmacist resolved these problems, monitored the patient for the possible recurrence of a problem, and prevented future

problems in collaboration with the patient, prescribers, and retail pharmacists.

In addition, the pharmacist collaborated with the patient's health care providers to optimize the use of medications and achieve treatment goals, and coordinated the patient's medication across multiple prescribers and pharmacies. The pharmacist gave the patient an updated medication record to share with caregivers, prescribers, and new sites of care, such as hospitals. The patient also received a medication action plan to help him or her work on medication self-management goals and share decision making with prescribers. For example, the plan might have a goal of improving asthma control that required the patient to learn and demonstrate the proper way to use a medication inhaler.

The pharmacist sent a copy of the summary report—which included evidence-based recommendations to resolve drug therapy problems that the pharmacist had identified—to the patient's care provider. After the provider reviewed the report and took any necessary action, the report was added to the patient's medical record.

Finally, the pharmacist scheduled follow-up appointments with the patient to resolve any remaining drug therapy problems and evaluate the patient's progress toward the medication self-management goals.

Study Results

From July 2009 through May 2010, the nine pharmacists had 401 encounters with eighty-eight Medicaid patients (an average of 4.6 encounters per patient). Although this is obviously a limited sample and may not be useful in reaching very broad conclusions, we believe that it provides an example of the potential benefits of bringing pharmacists into patient care.

Most of the encounters (92 percent) were face-to-face; only 8 percent were conducted via telephone. The mean patient age was fifty-one years; 71 percent of the patients were female. The average number of medical conditions was 9.5 per patient, and 90 percent of the patients had more than five medical conditions. The average number of total medications (prescription and nonprescription) per patient was 15.7 (range: 5–30).

MEDICATION DISCREPANCIES We defined a *medication discrepancy* as “an inconsistency in the drug, dose, frequency, route, quantity dispensed, or current medication use by the patient between the Medicaid claims, medical chart, or patient's report of actual medication use at home.” The pharmacists detected 3,248 medication discrepancies. Thirty-four percent of them were differences between the patient's reported use of medication and the medication list in the

electronic health record. Forty-four percent were differences between the patient's reported use and the Medicaid pharmacy claims data.

There are various possible explanations for these discrepancies, including lack of coverage by Medicaid for some nonprescription drugs and herbal products; the patient's paying in cash for some medications and use of free physician samples; the patient's discontinuing medications already paid for; and pharmaceutical manufacturer assistance programs, through which companies that produce medications provide them for free or at greatly reduced costs for patients who demonstrate financial or other need.

About a fifth (22 percent) of the discrepancies were differences between medications listed in the electronic health record and the pharmacy claims data, which may be due to the patient's discontinuing the use of a medication, or a change in his or her eligibility for Medicaid. We found that 51 percent of all medication discrepancies resulted from discontinued medications by either the patient or the prescriber.

IDENTIFYING DRUG THERAPY PROBLEMS The pharmacists identified 917 drug therapy problems, or an average of 10.4 problems per patient and 2.3 problems per encounter.

Exhibit 1 summarizes the categories and frequencies of drug therapy problems. The majority (73.8 percent) of the problems fell in the categories of medication indication (the drug was unnecessary or an additional drug was needed), effectiveness, and safety—all of which stem from clinical decision-making and prescribing practices. Only 26.2 percent of the problems were attributed to patients' lack of adher-

ence to their medication regimens.

Medications used to treat diabetes (insulin and metformin), pain (nonsteroidal anti-inflammatory agents and opioids), and asthma and chronic obstructive pulmonary disease (inhalers and nebulized medications) were some of the medications that had the most frequent drug therapy problems. The most frequent problems involving these common prescription and nonprescription medications are shown in Exhibit 2.

Three pharmacists who were not providing medication management in our project and a physician classified the identified drug therapy problems according to the algorithm of the National Coordinating Council on Medication Error and Reporting Prevention.³ The majority (75.9 percent) of the problems were classified as preventable medication errors that required a pharmacist to intervene.

Our results differ from those of two other studies of medication management involving Medicaid patients.^{16,17} Those studies involved pharmacist medication management services in care sites where pharmacists may not have had access to patients' medical information and may have had fewer appointments with patients. Patients in our demonstration project had a higher number of medical conditions, chronic medications, and drug therapy problems compared to the patients in the other studies.^{16,17} The higher number of problems may be due to the greater intensity and frequency of our patient-pharmacist visits, compared to the other studies. Also, we evaluated all the patients' medical conditions, rather than focusing on a specific disease state, and our pharmacists had full access to the patients'

EXHIBIT 1

Summary Of Drug Therapy Problems

Category of problem	Percent of total (N = 917)
Indication	30.1
Patient needs additional drug	22.7
Drug is unnecessary	7.4
Effectiveness	23.1
Dose is too low	16.3
Patient needs different drug	6.8
Safety	20.6
Patient has adverse drug event	15.7
Dose is too high	4.9
Adherence	26.2
Patient has poor understanding of instructions	10.8
Patient cannot take or prefers not to	7.2
Patient forgets to take	4.3
Patient cannot afford (OTC medications)	2.2
Drug is not available or not covered in preferred drug list	1.7

SOURCE Authors' analysis, based on drug therapy problem taxonomy in Cipolle RJ, Strand LM, Morley PC. *Pharmaceutical care practice: the clinician's guide*. 2nd ed. New York (NY): McGraw-Hill; 2004. **NOTE** OTC is over-the-counter.

EXHIBIT 2

Four Types Of Drug Therapy Problems, By Medication

Medication	Indication		Effectiveness		Safety		
	Additional med. needed (%)	Unnecessary med. (%)	Dose too low (%)	Different med. needed (%)	Adverse drug event (%)	Dose too high (%)	Adherence (%)
Insulin	7	0	28	20	15	9	22
Nonsteroidal anti-inflammatories	14	23	5	7	30	0	23
Proton pump inhibitors	3	3	26	18	13	13	26
Statins	8	0	32	3	5	27	24
Inhaler/nebulizer for asthma or COPD	19	6	16	10	6	3	39
Opioids	10	14	17	24	28	3	3
Combination product inhaler/nebulizer for asthma and COPD	0	12	12	0	8	0	69
Steroid inhaler	8	38	13	0	8	4	29
Metformin	11	0	17	0	22	6	44
Quetiapine	6	0	19	0	50	6	19

SOURCE Authors' analysis. **NOTES** Not all percentages sum to 100 because of rounding. COPD is chronic obstructive pulmonary disease.

electronic health records, and thus to their medical and lab data.

FAILURE TO RECOMMEND PREVENTION THERAPIES The pharmacists in our project detected sixty-three incidents in which medications did not comply with current evidence-based guidelines. The most common problems were not prescribing aspirin to prevent myocardial infarction and stroke, or in patients with diabetes, an omission that occurred with 26 percent of the patients in the project; not prescribing calcium and vitamin D to prevent osteoporosis, an omission that also occurred with 26 percent of the patients; and not prescribing medications to help patients stop smoking, an omission that occurred with 19 percent of the patients. In these cases, the pharmacists recommended that the patients' providers prescribe the missing medications.

RESOLUTION OF DRUG THERAPY PROBLEMS Nearly 80 percent of the 917 drug therapy problems that the pharmacists identified were resolved after four patient-pharmacist encounters. The remaining problems were not resolved because they involved patients who did not have a follow-up encounter with their provider before the project ended.

Approximately 78 percent of the medication problems were resolved without requiring the patient to make a separate appointment with his or her primary care provider. Some examples of the pharmacists' solutions in these cases included changing the timing of medication administration to eliminate adverse drug events or drug interactions; changing when, in relation to taking medication, patients monitored their

blood glucose levels; and recommending that patients not abruptly discontinue taking chronic medications.

The pharmacists contacted prescribers when a new or changed prescription or lab test was needed to resolve drug therapy problems. The majority (82 percent) of prescribers reported making at least one change in patients' therapies based on the pharmacists' recommendations.

COST IMPLICATIONS Working with state Medicaid staff, we examined total health care costs—that is, all medical, hospital, pharmacy, and emergency department expenses—for project participants. The total Medicaid drug claims for participants in the year before the project were \$423,387, and total health care costs were \$574,817. Extrapolating annual costs from the costs during our study period, we estimate that if the project had continued for a full year, the total drug claims for participants would have been \$324,553, and the total health care costs would have been \$434,465.

The pharmacists' interventions resulted in an estimated annual saving of \$1,123 per patient on medication claims, because of discontinuing unnecessary medications and replacing others with less expensive medications. In addition, there was an estimated annual savings of \$472 per patient on medical, hospital, and emergency department expenses. The estimated total savings are approximately 2.5 times the cost of the fees for the pharmacists and network administration.

Discussion

TEAM-BASED CARE In our project, primary care providers and pharmacists worked together, communicating in a timely manner to ensure the exchange of medication information and coordination of care. The physicians recognized that the pharmacists had both the skills and the time to elicit information from patients to prepare a comprehensive medication list, which the pharmacists could evaluate in order to achieve appropriate, safe, and cost-effective medication therapy. Such an interdisciplinary approach to medication management can enhance physicians' efforts in helping patients reach their health care goals.

PROGRESS TOWARD PATIENTS' GOALS Specifically, pharmacists met with patients—sometimes family members or caregivers were also present—to review and evaluate the medications each patient was taking. The pharmacist prepared a medication action plan, working with the patient to set realistic medication self-management goals, such as learning proper medication administration techniques, as discussed above. The plan and its goals promoted a high level of patient engagement.

At the first patient-pharmacist visit, 63 percent of the patients' treatment goals had been reached. After collaborating with both providers and patients, pharmacists were able to help patients achieve 91 percent of their treatment goals by the final visit.

The pharmacist monitored the patient's progress and any actions the patient or provider needed to take to achieve these goals. In addition, pharmacists made recommendations to providers when they were not following evidence-based guidelines for medication therapy.

MEDICATION SAFETY The pharmacists identified possible safety issues that stemmed from disparate medication lists in electronic health records and prescription claims. Many were attributable to discontinuations of medication that were not recorded in medical records or known to the provider.

When a provider discontinues a medication without the patient's fully understanding why, the patient often continues to refill the prescription as long as possible. Conversely, a patient may discontinue a medication without telling his or her provider. In either case, there can be increased costs for additional medications to achieve treatment goals, for emergency department visits, or for hospitalizations. Collaboration between the patient, pharmacist, and physician can manage or avoid this type of preventable medication error.

CONTINUOUS CARE Pharmacists provided medication management services between pa-

tients' visits to their primary care provider. For example, pharmacists adjusted the frequency of follow-up visits based on the complexity of the drug regimen, the number of drug therapy problems that the pharmacist had identified, and the patient's progress toward treatment and self-management goals. This kind of intervention for patients with chronic conditions may not be effective if patients see a pharmacist only once or annually.

Having met with a pharmacist in the primary care provider's office, patients viewed the pharmacist as a member of their medical home team. They were invited to complete an anonymous survey at their last meeting with the pharmacist, and their responses indicated that they had developed a relationship of trust with their pharmacist. One patient wrote on the survey: "The most important part of meeting with my pharmacist was [that] she communicated with my doctor and then when we met we were all on the same page."

QUALITY IMPROVEMENT Pharmacists in our project were able to evaluate each patient's electronic health record and medication use at home for medication appropriateness, effectiveness, and safety and for patient adherence, in that order. For drug therapy problems related to clinical decision-making and prescribing practices, the pharmacist was able to collaborate with the provider to change the medication regimen. For adherence problems, the pharmacist first determined that the medications met all of the appropriateness, effectiveness, and safety criteria. Only then did the pharmacist develop a tailored medication action plan with the patient that incorporated any changes made in the medication regimen.

Today, most community pharmacists do not have access to a patient's complete medical record or medication history if patients use more than one pharmacy. Therefore, the pharmacist might lack the requisite data to identify or monitor many drug therapy problems. A pharmacist may be able to address only adherence problems that can be identified from the patient's records in that pharmacy.

One result is that payers and policy makers often focus on adherence to the exclusion of other types of preventable medication errors. This can lead to missing unnecessary or duplicate medications, ineffective medication dosages, adverse drug events, and drug interactions—all examples of medication issues that can affect total health care costs.

The e-prescribing systems at the sites in our project had only the capacity to send electronic prescriptions to the pharmacy. Medication discrepancies and errors could be reduced with full

e-prescribing functionality that made available at the point of care the patient's complete medication history from multiple prescribers and pharmacies. However, medication errors related to patients' use of medications at home, medications discontinued by the patient or provider, and use of nonprescription medications would persist because they cannot be detected by e-prescribing systems.

Our findings demonstrate the importance of having a complete medical record and active medication list to carry out comprehensive medication management services.

Health information exchanges—in which patients give permission for their health data to be shared among their providers in a secure environment—would facilitate care in which pharmacists could access patients' medical records, update a consolidated medication list, and communicate medication management recommendations with all care team members. Other health care professionals could access the consolidated list and be confident that it was updated each time the patient had a new, changed, or discontinued medication.

A health information exchange could be useful for medication reconciliation or medication assessments when a patient moves from one care setting to another. It could also help prevent medication errors that are attributable to incomplete or inaccurate medication histories, poor documentation, poor patient recall, discrepancies in medication lists, cultural or health literacy challenges, and therapies discontinued by

the patient or provider.

PAYMENT REFORM Exhibit 3 shows a fee-for-service payment model for medication management services that has been used in the Minnesota Medicaid program. Greater use of pharmacist Current Procedural Terminology (CPT) codes, which became permanent in the American Medical Association's CPT code set in January 2008,¹⁸ could facilitate payment for pharmacist-provided medication management services. In addition, other payment reform models—such as global payments, care management fees, and shared savings—should include medication management services as part of team-based care.¹⁹

Conclusion

Teamwork among health care professionals is crucial for optimizing outcomes for patients with chronic diseases, promoting medication safety, and ensuring cost-effective therapy regimens. Our project demonstrated that pharmacists working in a contractual model can improve medication use and safety. Expanding the health care team to include pharmacists who provide medication management services can improve patient outcomes and reduce overall health costs.

Innovative pilot programs should include pharmacists as members of the primary care team, in order to assess new medication management work flows and referral models involving pharmacists. We recommend that the Center for

EXHIBIT 3

Medication Management Services Fee-For-Service Model

	Level of service				
	Level 1 (focused)	Level 2 (expanded)	Level 3 (detailed)	Level 4 (expanded detailed)	Level 5 (comprehensive)
Service					
Assessment of drug-related needs	Problem with 1 med.	Problem with 2 meds.	Problem with 3–5 meds.	Problem with 6–8 meds.	Problem with 9 or more meds.
No. of drug therapy problems identified	0	1	2	3	4 or more
Complexity of care planning and follow-up evaluation	Straightforward (1 medical condition)	Straightforward (1 medical condition)	Low complexity (2 medical conditions)	Moderate complexity (3 medical conditions)	High complexity (4 or more medical conditions)
Face-to-face time (minutes)	About 15	About 16–30	About 31–45	About 46–60	More than 60
Pharmacy CPT code	99605 (first encounter with patient) or 99606 (follow-up encounter)	99605 (or 99606) and 99607	99605 (or 99606) and 2 times 99607	99605 (or 99606) and 3 times 99607	99605 (or 99606) and 4 times 99607
Payment amount	\$	\$\$	\$\$\$	\$\$\$\$	\$\$\$\$\$

SOURCE Adapted from Note 17 in text; used with permission. **NOTES** Payment amounts (\$) are listed as a relative scale. CPT is Current Procedural Terminology. Pharmacy CPT codes became permanent in January 2008 to reimburse pharmacists' medication management services. See Note 18 in text.

Medicare and Medicaid Innovation support the evaluation of pharmacist-provided medication management services in primary care medical homes, accountable care organizations, and community health and care transition teams, as well as research to explore how to enhance team-based care. ■

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Marie Smith is a professor and assistant dean at the School of Pharmacy, University of Connecticut.

Marie Smith, Margherita Giuliano, and Michael Starkowski present findings showing that pharmacist-provided medication management services can improve quality and contribute to cost savings in a medical home model. The results stem from a Medicaid Transformation Grant sponsored by the Centers for Medicare and Medicaid Services.

The project studied was a collaboration among the Connecticut Medicaid program; the Connecticut Pharmacists Association; and the University of Connecticut School of Pharmacy. It provided “an opportunity to test a new pharmacist practice model supported by health information technology for patients with chronic conditions and complex medication regimes,” Smith says.

Smith is assistant dean for practice and public policy partnerships and a professor at the University of Connecticut School of Pharmacy. Her research considers policy issues related to e-health and health information exchanges; and medication management models that optimize medication use, increase medication safety, and improve patient adherence in the

primary care and patient-centered medical home practice settings.

Previously, she was vice president for e-strategy and integration at Aventis Pharmaceuticals’ North American Commercial Operations. Smith received her pharmacy degrees from the schools of pharmacy at the University of Connecticut and the Medical College of Virginia. She completed a fellowship in change management at the Johns Hopkins University.



Margherita R. Giuliano is executive vice president of the Connecticut Pharmacists Association.

Giuliano is executive vice president of the Connecticut Pharmacists Association and is past president of the National Alliance of State Pharmacy Associations. She has served as board administrator for the Connecticut Commission of Pharmacy, in the state’s Department of Consumer Protection. She has also participated in demonstration and research projects involving women’s heart disease, smoking cessation initiatives, and medication therapy management. She received her pharmacy degree from the University of Connecticut, where she also received a Distinguished Alumni Award.



Michael P. Starkowski is the former commissioner of the Connecticut Department of Social Services.

Starkowski was commissioner of the Connecticut Department of Social Services from March 2007 to April 2011, during the time this project was undertaken. He has been instrumental in preparing for the implementation of national health care reform in Connecticut, in addition to administering a wide range of health coverage and human service programs that serve nearly 750,000 state residents. In his previous position as deputy commissioner for administration at the Connecticut Department of Social Services, he managed the state government’s largest agency budget and had direct responsibility for public health care financing and contracting with hundreds of nonprofit and for-profit human services organizations.

Starkowski received the Connecticut Pharmacists Association Special Recognition Award for outstanding commitment to pharmacy and the Excellence in Children’s Policymaking Award from the Connecticut Children’s Medical Center and Mohegan Tribal Nation. He earned his bachelor’s degree in accounting from Central Connecticut State University.

Errata

PRONOVOST ET AL., APRIL 2011, P. 573

The acknowledgment for coauthor Richard Lilford should have contained the following statement: Richard Lilford was funded by the National Institute for Health Research (NIHR) through the Collaborations for Leadership in Applied Health Research and Care for Birmingham and Black Country (CLAHRC-BBC) program. The views expressed in this article are not necessarily those of the NIHR; the Department of Health; the University of Birmingham; or the CLAHRC-BBC.

CLASSEN ET AL., APRIL 2011, P. 585

This article contained several errors. First, in the final paragraph under

“Study Results,” the Patient Safety Indicators method had a sensitivity of 5.8, not 8.5 as shown. Also, in Exhibit 3, the values for “Pulmonary/VTE” in severity level I should have been 1, not 2, leading to a total of 16, not 17. These errors do not affect the article’s findings and conclusions. The text and Exhibit 3 have been corrected online.

SMITH ET AL., APRIL 2011, P. 646,

P. 652, P. 654 This article contained several errors. First, the fifth sentence in the abstract (p. 646) should have stated that pharmacists resolved nearly 80 percent of drug therapy problems, not nearly 83 percent. Next, Michael P. Starkowski’s tenure as commissioner of the Connecticut Department of Social

Services ended in April 2011. This should have been reflected in the biographical information on pp. 646 and 654. In addition, the notes to Exhibit 3 (p. 652) should have referred readers to Note 18 in text, not Note 19 in text.

PEABODY ET AL., APRIL 2011, P. 773,

P. 781 Information about these authors contained an error. John Peabody is chief medical officer at Sg2. This information was omitted from his biography on p. 773 and was erroneously attributed to a coauthor on p. 781.

WYNIA ET AL., FEBRUARY 2011, P. 267

On p. 267 of this article, first paragraph under “Study Data And Methods,” the word “psychologists” should be “psychiatrists.”